FACT SHEET

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WATER CONSERVATION IN THE HOME

For Improved Septic Tank System Performance and Water Savings

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The average Texan consumes 50 to 75 gallons of water daily. This consumption rate was not critical when the water supply was plentiful and the population was small. Today, however, with the shortage of water becoming more evident across the state and the cost of water supplies and treatment systems rising rapidly, wasteful consumption of water in the home is an unaffordable luxury. Not only is the cost of water becoming critical but there is also the expense of treating excess wastewater at the other end of the pipeline.

Both state and federal governments are encouraging municipalities, communities, industries and individuals to conserve water because supplies are limited, the cost is increasing and water conservation is also energy conservation.

Does water conservation pay if you live in a rural setting with your own water well? It can, especially when using a septic tank system for home waste disposal. Table 1 shows the breakdown of daily, personal water use in the average home, indicating that about 95 percent of this water ends up in the septic tank. Water conservation can improve and prolong operation of the system. If your septic tank fails or shows signs of problems, install water-conserving devices as the first repair procedure. In many cases such a simple and inexpensive operation can reduce wastewater flow by a minimum of 20 to 30 percent, decreasing the problem of sewage backup in your yard or home, and possibly avoiding a costly and unsightly repair job to the septic tank system.

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Table 1. Residential water consumption.

Home uses	Daily water use per person	
Toilet	32 gal	45%
Bathing/personal	21 gal	30%
Laundry/dishes	14 gal	20%
Drinking/cooking	3 gal	5%
	70 gal	

Water conservation in the home also reduces energy consumption since less water use reduces the energy required to pump, treat and heat water. At 6 cents per kilowatt hour it costs about 1½ cents to heat 1 gallon of water. If you shower once each day for 5 minutes using a conventional shower head, 30 to 50 gallons of water per shower are required. Compare this to a person using a water-saving shower head which uses 12.5 to 15 gallons per 5-minute shower for a savings of 15 to 37 gallons of water per shower. Since most showers are about 60 percent hot water, a savings of 14 to 33 cents per shower are possible. In an average home with four people, this could amount to as much as $40 per month in energy savings on hot water alone.

Several devices as well as some special water-conserving appliances and a few common sense rules can be used in the home to reduce the amount of water used each day. The following water-conserving devices and tips might help reduce water needs. Use those which are most appropriate for your situation. The list is divided into several major headings, including commode modifications, shower and faucet modifications, pressure-reducing valves, water-conserving appliances and some good common sense.

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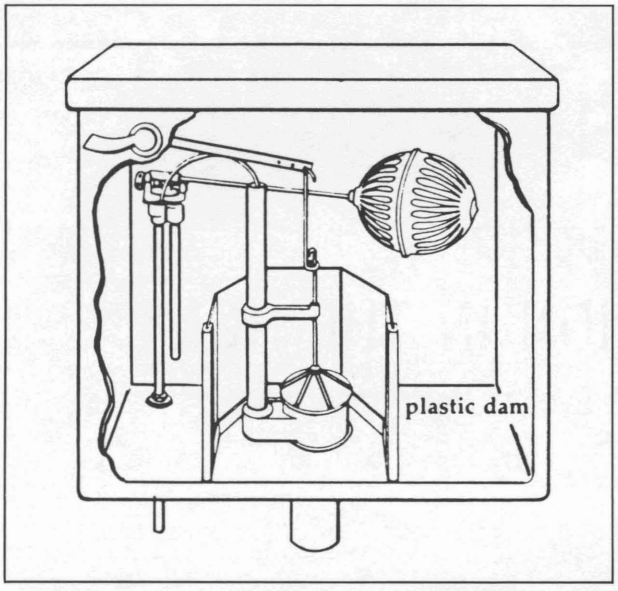

Figure 1. A small plastic dam installed around the flush valve reduces the amount of water flowing from the flush tank into the toilet bowl without reducing the force of the flow.

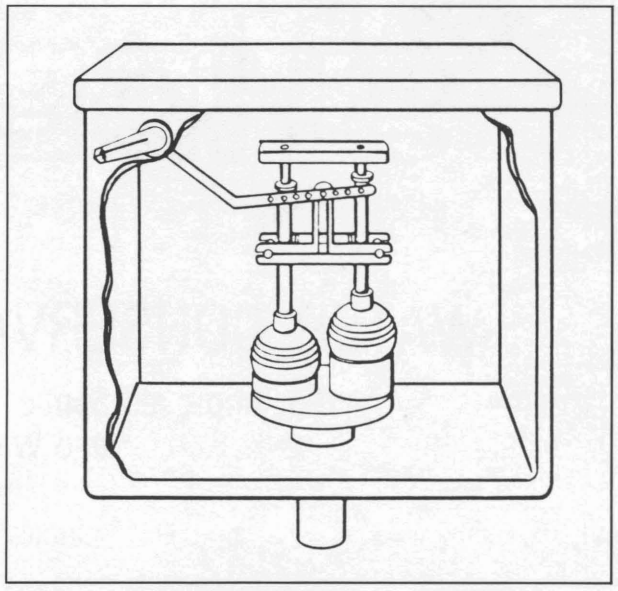

Figure 2. A dual flush mechanism permits a full flush to remove solids if the trip handle is moved in one direction, and a partial flush for liquid wastes if moved in the other direction.

Commode Modifications

The conventional commode uses 5 to 7 gallons of water per flush with an average of five to six flushes per day per person in a household. Thus it is easy to see that any reductions in volume per flush can result in substantial water savings and significant reduction in loading a septic tank system. The following devices are efficient and economical in reducing the volume of water used in home toilets.

- *Plastic bottles*. A 1-quart bottle in the commode water closet displaces 1 quart of water; a 1 gallon bottle displaces 1 gallon of water and reduces the volume per flush accordingly. Bottles work well and they are free. To install a plastic bottle, put 1 to 2 inches of sand or gravel in the bottom of the bottle and fill with water. Place the filled bottle on the right side of the flapper valve as far away from the flush mechanism as possible. Replace the tank cover. The bottle saves water with each flush.
- *Tank dams*. These devices are available at most plumbing supply houses for about $6 to $8. Place these dams in the lower portion of the commode tank to prevent water behind the dam from leaving the tank during flushing. If a pair of dams are installed on each side of the flapper value, water use is reduced by about 2 gallons per flush. They are easily installed, and the original depth of water in the tank is maintained. This is important since the hydraulic head (or depth) of water moves wastes from the commode into the sewer line.
- *Level-adjusting valve*. These are advertised as "new technology for your toilet." They are simply an adjustable diaphragm valve which controls the water depth in the closet. The lower the water depth, the less water used in flushing. As stated above, this is a big disadvantage since the hydraulic head is reduced and the flushing action impaired because less force is available to move wastes from the commode. These valves cost $5 to $7.
- *Dual flush modification*. Several modifications are currently available and most add weight to the flapper valve. This causes the valve to close before all the water has flushed from the tank, thus saving about 2 gallons per flush for a "light" flush. This is generally adequate for liquid wastes, but for solid wastes, a "heavy" flush is needed thus requiring the entire 5 gallons. These devices cost $3 to $12.
- *Low volume toilets*. The average commode uses approximately 5 gallons of water per flush. Most plumbing appliance manufacturers now market a low volume commode which utilizes only 3 gallons per flush. These units are available in a variety of colors and materials and can save the average family up to 40 gallons of water per day. Most of these commodes have been tested scientifically and perform as well as old, conventional models. Costs may range from $50 to $150 which may prohibit retrofit of these units into existing homes but are most cost effective for new installations or needed replacements. Some special toilets are on the market which

use 1 gallon per flush but are quite expensive and are more suited for special-use situations.

- *Use of bricks*. Placing a brick in a tank reduces the flush volume by about 1 quart. Bricks eventually break down in water and once this begins in the tank, small particles of brick or sand may lodge in the tank valve and prevent proper closing. This wastes much more water than was saved, thus the general recommendation: *Do not use bricks in the tank*.

Faucet and Shower Modifications

- *Water-saving shower heads*. Most water-conserving shower heads on the market have flow rates of 2 to 5 gallons per minute. Compare this to a flow rate of 6 to 10 gallons per minute for a conventional shower head. One can immediately see the water savings for an average family taking four to six showers per day of 5 to 8 minutes each. Water savings of up to 200 gallons per day per household have been documented. Two varieties of water-saving shower heads are available: one is a flow-restricting head, the other an aerated shower head. A water-conserving shower massager is also available. The cost of these devices ranges from about $8 to $25, but this cost can be recovered quickly in energy savings alone.
- *Faucet aerators*. Conventional faucets generally produce about 4 gallons per minute as compared to 2½ gallons per minute for faucet aerators. While these devices decrease water usage at the faucet, they do not decrease water force or cleansing capacity. They are more commonly used in bathrooms than in kitchens but can result in substantial water and energy savings. These devices cost $2 to $3, and this cost can be recovered in less than 1 hour of hot water flow through the faucet.
- *Line inserts and flow restrictors*. These devices reduce the size of the orifice through which water flows. By reducing the orifice size of the pipe while maintaining the same water pressure, the amount of water flowing through the pipe is reduced. Most plumbing fixtures are designed to operate at a specified design flow rate, and a reduction in this flow decreases the efficiency of that fixture. These flow-restricting devices and line inserts are generally quite expensive, and it may be cheaper to replace other fixtures.

Pressure-Reducing Valves

- In areas experiencing high water pressures, large quantities of water may be wasted inadvertently. Water pressure in excess of 50 to 60 pounds per square inch is in this category. Valves can be installed on the incoming water supply line and adjusted to reduce household water pressures to 40 pounds per square inch. This is sufficient to operate most household appliances and maintain water flows at sufficient levels without causing undue waste. Reducing pressure from 60 to 40 pounds per square inch in a ½-inch pipe reduces the flow rate by almost 15 gallons per minute. Multiply this by the amount of time the faucets are running in your home to see potential water and energy savings. If you open the faucets only 5 minutes per day, a savings of 75 gallons of water per household could be achieved easily.

Appliances

- Several household appliances are advertised as water conserving. Many washing machines and dishwashers are now equipped with load levelers, load controls and rinse adjustments. The homeowner can actually adjust the amount of water required for each wash situation. The water required for the operation of a washing machine varies from just over 20 gallons to more than 50 gallons per wash for the various makes of machines. While the cost of a washing machine is substantial, often running over $400, the difference in cost of low water users to high water users is not that great, and the difference might mean the saving of a septic tank system. Certainly large amounts of energy and water can be saved over the life of the appliance.

Common Sense

Water is a valuable natural resource and like any other commodity, it requires the use of common sense. Common sense water management in the home may include a variety of things from repair of leaks to remembering to turn off that faucet. The following list includes some things to consider in reducing daily water use. Each family can make its own list and routinely remind each other that water is our most valuable natural resource.

- *Repair leaks*. Of the total amount of water used in most homes, an estimated 5 to 10 percent is wasted through leaks. One drop per second wasted is equivalent to 7 gallons per day; a small steady trickle may waste from 20 to 200 gallons per day. A leaking toilet valve is one of the worst offenders in the home, wasting as much as 100 to 200 gallons per day. Check leaks and repair them as quickly as possible. Rubber washers and flapper valves are relatively inex-

pensive compared to the cost of water and energy losses.

- *Accumulate clothes and dishes for full load.* Avoid using the full wash cycle with a partial load of clothing or dishes.
- *Avoid using a garbage grinder.* Garbage grinders not only waste water but put an undue load on your septic tank. If using a garbage grinder, use an extra large capacity septic tank, or even better, use dual tanks with one tank serving only the kitchen sink with the grinder.
- *Turn off faucets when not needed.* When shaving, brushing teeth, washing vegetables or emptying ice trays, do not leave the water running during the entire process. Keep a water bottle in the refrigerator for drinking purposes. By using running water only when it is absolutely required, a significant amount of water can be saved.
- *Reduce water during bathing.* Take shorter showers or accumulate less water in the tub for a bath.
- *Flush the toilet less often.* Do not use the toilet as a disposal for anything other than human wastes. Even then, you may find that the toilet can be flushed less often.

Water conservation is as much attitude as it is technology. If you think about water conservation, you will find yourself practicing water-saving habits inside and outside the home.

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